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NOTES FOR: THE RECORD

SUBJECT: Burial, Underground Packaging for

1. U. S. approach to burial programs was greatly influenced by the desire to cache items such as rifles, machine guns, mortars, and ammunition used for guerrilla warfare. Lists of items for burial ran into the hundreds and were of all conceivable sizes and shapes. It was apparent that no container could begin to solve requirements. A container large enough to hold all sizes of items would have been unwieldy for a large majority of the operations. Use of individual hermatically sealed terneplate cans (steel coated with alloy of 4 parts lead to 1 part tin (up to 90%-10%) was considered. This was not used as it would entail different interior shoreing for each item. The use of available standard packaging materials was investigated with strippable protective compound (hot-dipping) of either the ethylcellulose formulation or the cellulose-acetate-butyrate formulation being found acceptable. These compounds are applied at 350-390° F and, therefore, are not recommended for explosives and incendiaries. Standard cloth-backed aluminum foil barrier material that is heat sealable was found satisfactory for burial except for the fact that the cloth backing rotted away. This material had the advantage in that it was a light, flexible packaging that could be used to individually package any size object. It could be readily sealed wherever electricity was available, by the use of a light, portable hand sealer. Therefore, a superior foil barrier material has been developed consisting of foil with a nylon cloth backing having the following characteristics:

.001 vinyl - .00045 foil - 2-1/2 oz. fiber thin coated both sides - 2-1/2 oz. total;
.00045 foil - 2-1/2 fiber thin coated one side 2-1/2 oz. (nitrite).

Tensile 254 x 212, tear 21 x 15 lbs.
Puncture/face 32 x back 31.
Seal - 450° F, 10 sec.

Moisture vapor transmission tests on this material gave results so low that they were beyond the realm of accuracy of instrument. When submitted to cycle test under Specification MIL-B-131 the results were lower than for any similar material the Department of Ordnance had ever tested. Maximum allowable is 10% pickup or 15% total. Barrier was tested with 5-5-1/2% moisture at start and ended with 5.42, 5.95, 7.09, and 6.07 percents.

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2. Another type of foil barrier material backed by fiberglass cloth was developed but proved unsatisfactory. Rubberized fabric bags were developed as water and not moisture vapor barrier, although they may prove to be both. Bag is used as light container to facilitate carrying, protect packaging from water in lowland burial, ease raising material when dug up, and act as rubberized fabric during operations. Bag recently viewed by British was a first prototype, which is admittedly not perfect. Later bags will be neoprene, instead of GR8 laminated on fiberthin nylon cloth similar to that used to back the new foil barrier material. Some bags have been found to leak due to the manner used to form the bags; however, this will be easily rectified by using a different method of fabricating bag, which will include vulcanizing after fabrication. If additional bags are made they will be of neoprene laminated on nylon rip-stop or fiberthin cloth. Method of sealing present bag is admittedly unsatisfactory for large scale work by unskilled or disinterested labor. This can be improved by bag made in one piece, like paper bag; that is, sealed at the top and then rolled down. Other method could be single, diagonal slit across on side of bag that could be sealed after bag was filled. As most RDD items are packaged in tin cans or foil barrier materials, they would need no additional packaging to go inside rubberized fabric bags.

3. We have never seen British burial containers with closure device. The sample we have does not even have a gasket, much less closure straps. It appears that their present closure might breathe under extreme cyclic conditions. Although it might be termed reusable, efficiency will probably decrease after first use. Tests under long periods of submersion should be conducted to determine just how it will stand up. The British container is constructed of two layers of approximately 1/16 inch aluminum. Limited rough handling test by us has shown the British container to be amazingly rugged for aluminum due to the sandwiched balsam layer. The aluminum gives a very light container and is probably satisfactory for burial in most soils. Note that our new foil barrier material employs aluminum foil which is well covered by a vinyl (plastic) coating.

4. Metallurgists consulted here prefer stainless steel to aluminum for a rugged burial container. Stainless steel is easier to fabricate than aluminum and its weld strength is much stronger - 29,000 psi versus 90,000 psi or better. Cost of a stainless steel container and an aluminum container would be about the same, aluminum being cheaper but more costly to fabricate. A great advantage of stainless steel is that if a closure were developed like that of the Navy Abandon Ship kit, it could be made of stainless steel, while aluminum would not be strong enough for closure apparatus and use of other metal would put dissimilar metal in the container.

Conclusion: Believe

Conclusion: Believe the British container to be satisfactory if the closure is adequate. Therefore, if a rigid container with a mechanical closure is desired immediately, we should use British containers. However, we will attempt to make our own, with an improved closure, out of either stainless steel or titanium.